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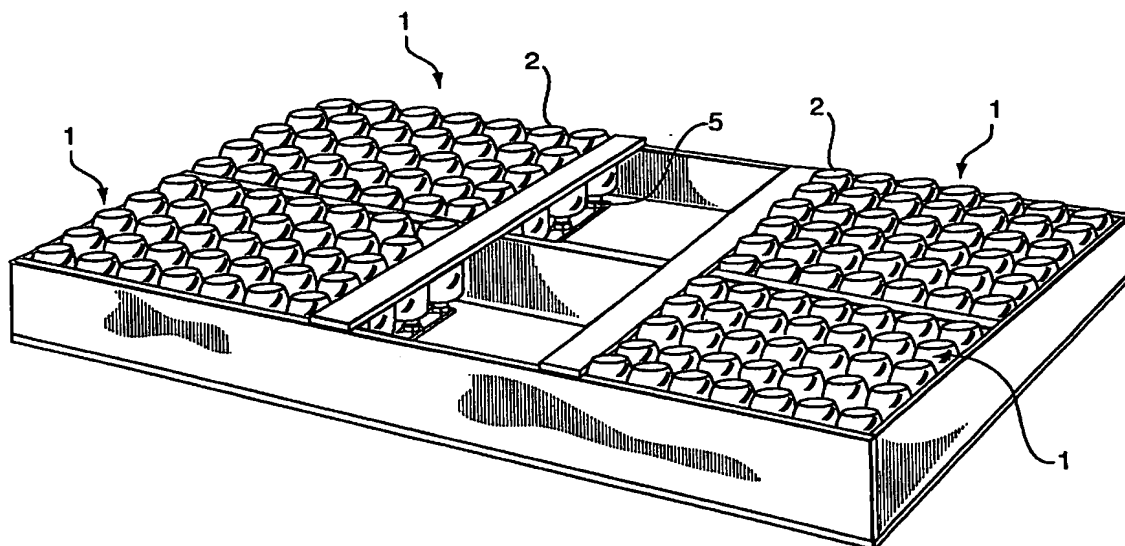
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: FRAME FOR ATTACHMENT TO A DOCK STRUCTURE HAVING MEANS TO RECEIVE CONTAINERS



(57) Abstract: A frame (1) adapted to receive containers, particularly empty plastic beverage containers (2), such as two-liter plastic pop bottles, and adapted to be attached to a dock structure (7). When the dock structure, frame and bottles are in mutual cooperation, the containers provide buoyancy to the dock structure. The containers are preferably screwed into the frame and may be removed.

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FRAME FOR ATTACHMENT TO A DOCK STRUCTURE HAVING MEANS TO RECEIVE CONTAINERS

BACKGROUND OF THE INVENTION

This invention relates generally to flotation devices such as, for example, cottage docks; floating bridges such as those used by all terrain vehicles, lawn tractors, golf carts; island docks, mooring docks for boats; floats for an anchor; or boardwalks. More specifically, the invention relates to a frame into which empty containers such as plastic beverage bottles are screwed and which can be attached to a dock or the like. Hereinafter the term dock structure will be understood to imply one of a cottage dock, floating bridge, island dock, mooring dock for boats, float for an anchor, boardwalk, or other similar structure.

Devices using plastic bottles as a means of flotation have been proposed in the art such as in United States Patent No. 5,235,929 entitled Docking System issued to Leisure Docks Inc. on August 17, 1993. That patent teaches a device made up of several modules, each module comprising a deck and side walls to form a hollow chamber in which plastic containers are adhered to each other, to the side walls, to the deck and to points on the bottom of the module. The device fails to provide an arrangement which allows for easy installation or replacement of bottles by a user. In addition, the patent fails to teach a device adapted for attachment to a dock.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is provided a frame for attachment to an underside of a dock structure to provide buoyancy thereto, characterized by a generally planar frame portion; a plurality of receiving members, attached to the frame portion and each adapted to receive a hollow container by holding and sealing an open end of the container, each of the receiving members comprising a plurality of supports extending in an outward radial direction with respect to each receiving member; and means for attaching the frame to the underside of a dock

structure, such that the containers depend from the frame and provide a buoyancy effect to the dock structure.

The frame is adapted to be attached to a dock structure and has means to receive empty containers, such as plastic beverage containers. When the dock structure, frame and containers are in mutual cooperation, the containers provide buoyancy to the dock structure. The means for receiving the containers may include female screw portions into which male screw portions of the containers can be screwed, ideally in fluid-tight manner. Preferred containers are two-liter plastic drink bottles. The frame includes a means to allow attachment of the frame to a dock structure such as holes by which the frame may be attached to a dock structure with fastening means such as screws.

According to another aspect of the present invention there is provided a dock system characterized by a dock structure; and a plurality of frames as described above wherein the frames are attached to an underside of said dock structure using said attaching means.

The present invention provides a frame with or without containers associated therewith and with or without a dock structure associated therewith.

A dock structure may be provided with additional features such as, for example, a towing means in order to aid in towing the device on land and/or on water, a ladder, recreational features, and the like.

The arrangement of the frame may be such that when all of the female screw portions are filled with containers, the containers come into contact with each other or, alternatively, such that the bottles are slightly spaced and do not come in contact with each other.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a frame according to an embodiment of the present

invention;

Figure 2 is a perspective view of the frame of Figure 1 into which two bottles are screwed;

Figure 3 is a perspective view of the frame of Figure 1 into which 25 bottles are screwed; and

Figure 4 is a perspective view showing four frames according to an embodiment of the present invention into which bottles are screwed and which are attached to a dock structure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A frame 1 according to an embodiment of the present invention is illustrated in Figures 1 to 3. The frame 1 is illustrated on its own in Figure 1 and in cooperation with bottles 2 in Figures 2 and 3 as described below. The frame 1 comprises a surface 4 and an array of female screw portions 3 thereon. The female screw portions 3 are each of substantially cylindrical form with a threaded interior. The female screw portions 3 are adapted to receive male screw portions of bottles 2 such as two-liter plastic pop bottles. The female screw portions 3 comprise eight supports 5 extending in an outward radial direction with respect to each screw portion 3. The surface 4 includes apertures 6 which can be used to attach the frame to a dock structure 7 as seen in Figure 4 in which four frames are used.

Arrangement of the female screw portions 3 relative to the surface 4 is dependent on the size of the bottle to be used and the desired shape of the surface 4. The size and dimensions of the female screw portions 3 are dependent on the size and dimensions of the male screw portions of the bottles 2 which are to be used. If a standard two-liter plastic bottle is to be used, the diameter of each female screw portion should be approximately 1 1/8 in. and if a square grid configuration having contacting bottles is desired (as seen for example in Figure 3), the distance between the centers of each of

the female screw portions 3 should be approximately $4 \frac{3}{8}$ in. In such a square grid configuration adapted to result in contacting bottles, the dimensions of the surface may advantageously be $1' 6 \frac{3}{4}"$ by $1' 6 \frac{3}{4}"$ and if bottles 2 are screwed into the frame 1 the outer dimensions of the array of bottles are $1' 9 \frac{7}{8}"$ by $1' 9 \frac{7}{8}"$.

In one embodiment of the present invention the frame and, in particular each female screw portion, is adapted to cooperate with an inner gasket to help ensure an air-tight seal. Such a gasket may be provided as part of the frame or otherwise.

Many different sizes and shapes of the frame 1 are contemplated for use in conjunction with a variety of dock structures. In fact, multiple frames 1 may be used with a single dock structure as seen in Figure 4. The shape of the frame 1 is not specifically limited and could be, for example, annular, triangular, rectangular and may include at least one internal cavity such as in a donut shape.

Because the bottles are screwed into the device, should one or more bottles become damaged, it/they may be replaced without the need for an involved procedure requiring special tools. The replacement may preferably be performed by the end user.

An alternative to the female screw portions is another means to receive containers such as two-liter pop bottles, such that the attachment is removable, secure and provides a good seal such as a clamp or a plug, over which the open end of the bottle can be pressed to create a secure structure and fluid-tight seal.

In an alternative embodiment the frame comprises a means to secure containers in place using a locking system in order to prevent potential tampering. In another embodiment, the frame comprises a means to secure containers in place so that the containers are not readily removable.

Referring to a system using a frame of the present invention, certain bottles may be partially filled or substantially filled with a liquid such as water, in order to adjust the flotation and buoyancy characteristics. The degree and geometric properties of flotation

are dependent, in part, upon which female screw portions are occupied, that is, the location and number of bottles which are in place. In one embodiment, means to hold the bottles in tight cooperation is provided in order to distribute the stresses. Such a means may be a strap which can be placed around the bottles or may be provided by a dock structure.

A dock structure used in conjunction with a frame of the present invention may include many features such as a means of anchorage, ladder or slide.

INDUSTRIAL APPLICABILITY

The frame for attachment to a dock structure having means to receive containers as taught herein generally provides improved means of assembling flotation devices such as, for example, cottage docks; floating bridges such as those used by all terrain vehicles, lawn tractors, golf carts; island docks, mooring docks for boats; floats for an anchor; or boardwalks.

CLAIMS:

1. A frame (1) for attachment to an underside of a dock structure to provide buoyancy thereto, characterized by:

a generally planar frame portion (4);

a plurality of receiving members (3), attached to said frame portion (4) and each adapted to receive a hollow container (2) by holding and sealing an open end of said container (2), each of said receiving members (3) comprising a plurality of supports (5) extending in an outward radial direction with respect to each receiving member (4); and means for attaching said frame (1) to the underside of a dock structure, such that said containers (2) depend from said frame (1) and provide a buoyancy effect to said dock structure.

2. A frame (1) according to claim 1 characterized in that each receiving member (3) comprises a female screw portion adapted to receive a male screw portion of one of said container (2).

3. A frame (1) according to claim 1 or 2 characterized in that each receiving member (3) comprises a substantially cylindrical portion extending normally from said frame portion (4) and a plurality of supports (5) extending in an outward radial direction with respect to said cylindrical portion.

4. A frame (1) according to claim 1 characterized in that each receiving member (3) comprises a clamp adapted to receive said containers (2).

5. A frame (1) according to claim 1 characterized in that each receiving member (3) comprises a plug adapted to receive said containers (2).

6. A frame (1) according to any one of claims 1 to 5 characterized in that said attaching means comprises a plurality of apertures in said frame (1) through which fastening means, used to attach said frame to said underside of said dock structure, may be inserted.

7. A frame (1) according to claim 6 characterized in that said fastening means comprises at least one screw.
8. A frame (1) according to any one of claims 1 to 7 characterized in that said containers (2) comprise two-liter plastic drink containers.
9. A frame (1) according to any one of claims 1 to 8 characterized in that said dock structure is a structure selected from the group consisting of a cottage dock, floating bridge, island dock, mooring dock for boats, float for an anchor and a boardwalk.
10. A frame (1) according to any one of claims 1 to 9 characterized in that each receiving member (3) comprises an internal gasket to enable an air- and fluid- tight seal between each receiving member (3) and said container (2).
11. A frame (1) according to any one of claims 1 to 10 characterized in that each receiving member (3) is oriented to enable the containers (2) to extend substantially normal to said frame (1).
12. A frame (1) according to any one of claims 1 to 11 characterized in that said receiving members (3) are positioned on said frame (1) in a grid to allow said containers (2) to be arranged in a grid form.
13. A frame (1) according to any one of claims 1 to 12 characterized in that said receiving members (3) are positioned on said frame (1) such that when the containers (2) are held by said receiving members (3), each container (2) contacts at least another container (2).
14. A frame (1) according to any one of claims 1 to 13 characterized in that said frame portion (4) is substantially in the form of right angle quadrilateral.

15. A frame (1) according to any one of claims 1 to 14 characterized in that each receiving member (3) comprises a lock which may be used to prevent potential tampering.
16. A frame (1) according to any one of claims 1 to 15 comprising a plurality of said receiving members (3) and a plurality of containers (2) attached thereto.
17. A frame (1) according to any one of claims 1 to 16 characterized in that each of said receiving members (3) includes eight of said supports (5).
18. A frame (1) according to any one of claims 1 to 17 further comprising said dock structure attached thereto using said attaching means.
19. A dock system characterized by:
a dock structure; and
a plurality of frames (1) according to any one of claims 1 to 17;
wherein said frames (1) are attached to an underside of said dock structure using said attaching means.

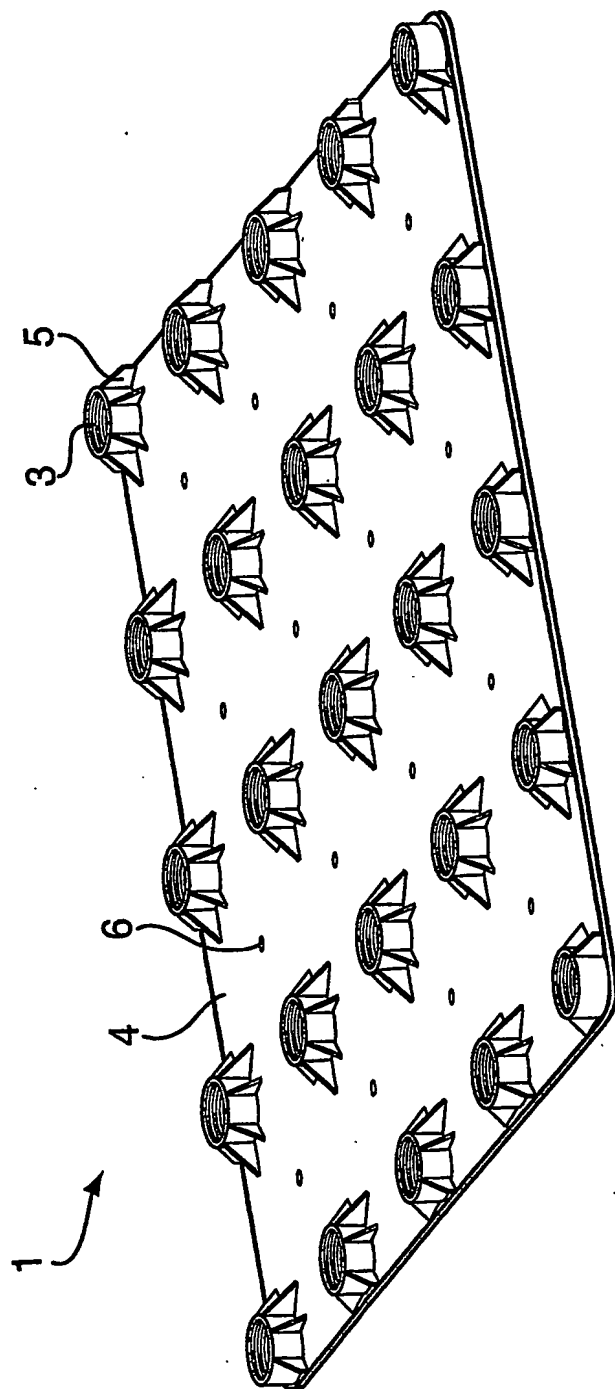
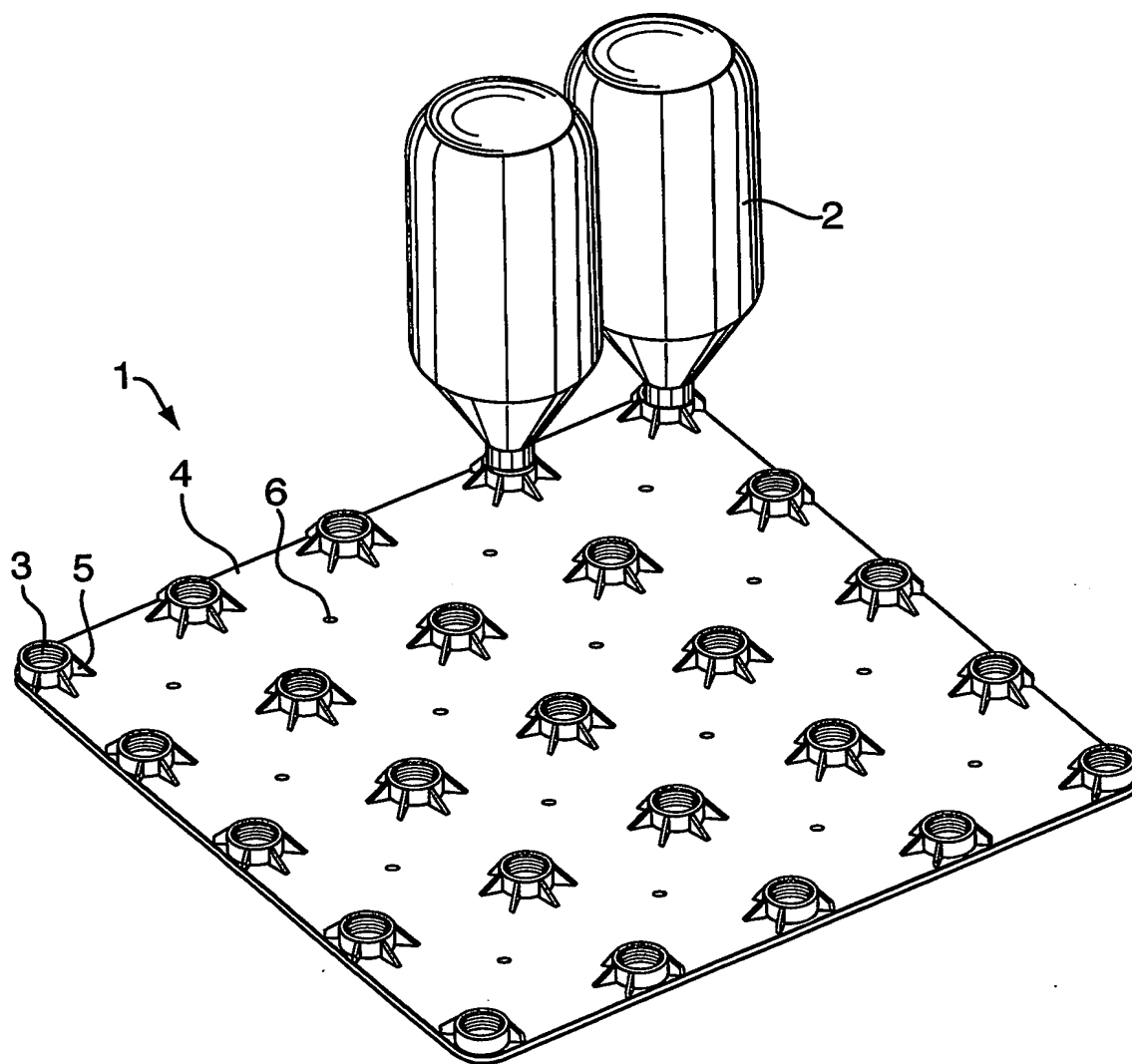


FIG. 1

**FIG. 2**

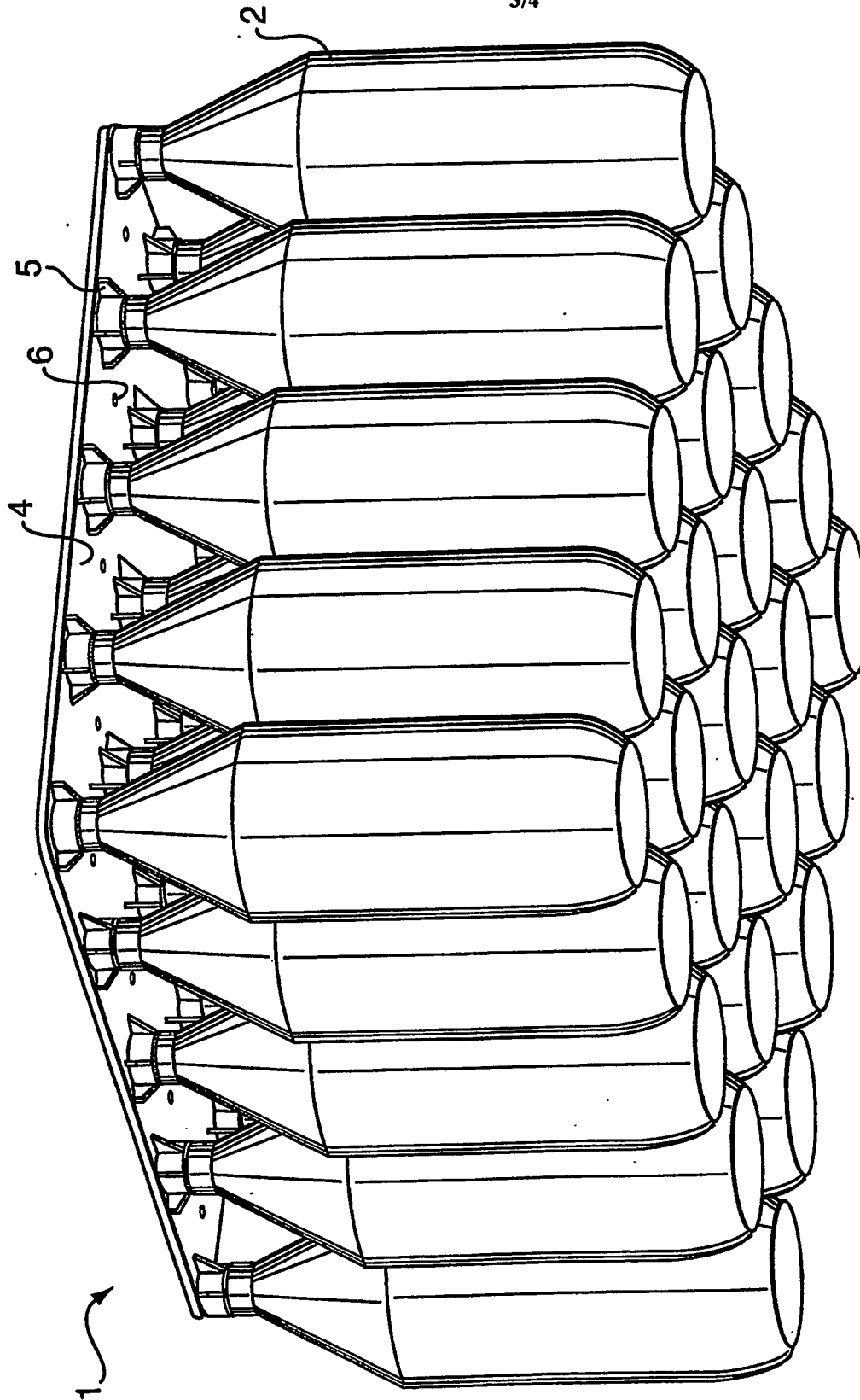


FIG. 3

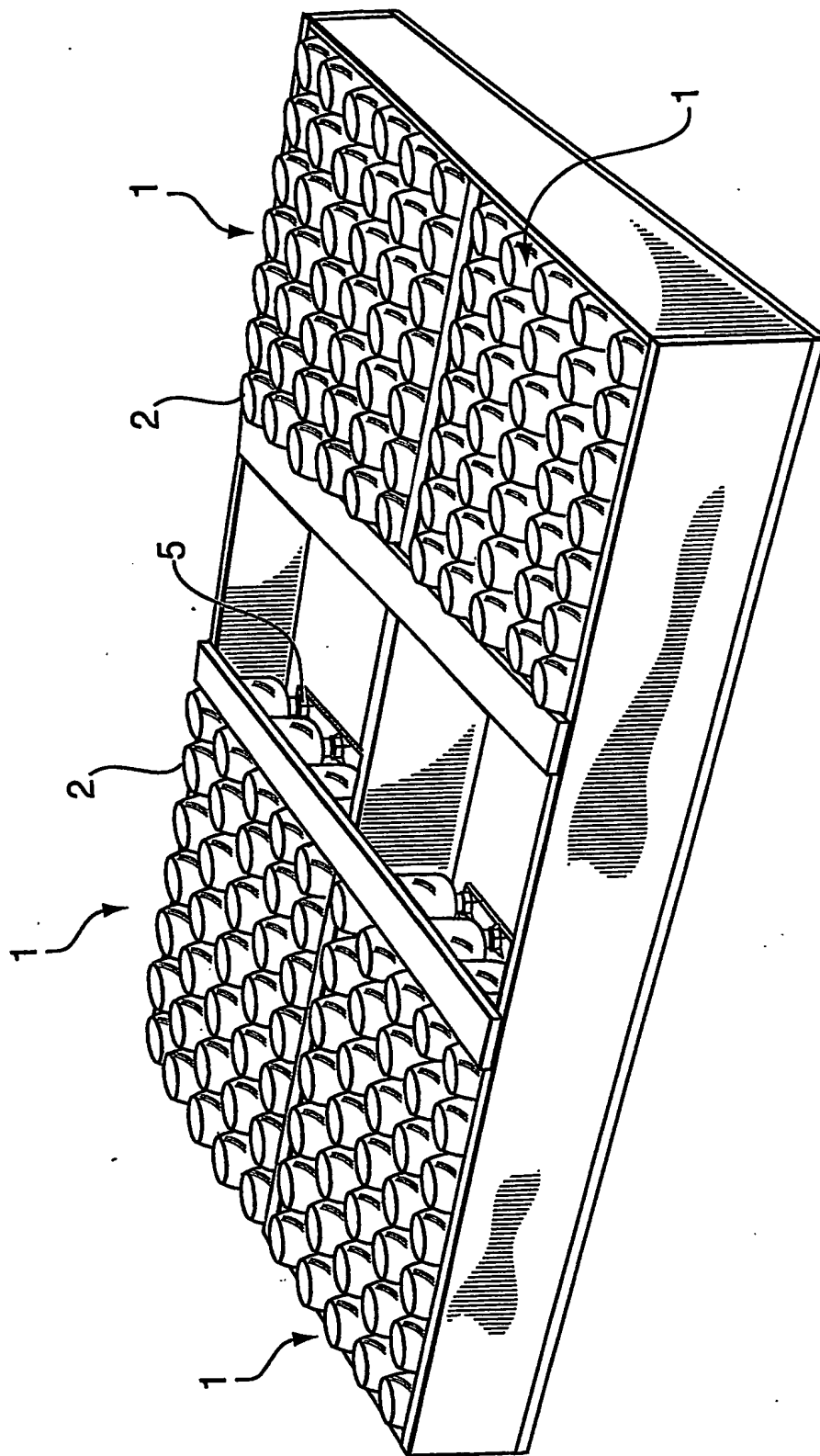


FIG. 4

INTERNATIONAL SEARCH REPORT

Inter application No
PCT/CA 03/00686

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B63B35/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | US 5 235 929 A (CHESTER BARBARA A ET AL) 17 August 1993 (1993-08-17) cited in the application | 1-3,6-9, 11-19 |
| Y | figures 1-4,6,8 | 4,10 |
| Y | US 4 988 317 A (RUBINSAK GILBERT A ET AL) 29 January 1991 (1991-01-29) figures | 4 |
| Y | US 5 658 178 A (VARGA THOMAS L) 19 August 1997 (1997-08-19) column 2, line 49 | 10 |
| A | US 5 743 205 A (MORRIS RICHARD D) 28 April 1998 (1998-04-28) figures | 1,19 |
| | --- -/-- | |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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